

fog showed a decided increase in frequency, with a maximum occurrence on about 40 per cent of the days over the region within approximately 100 miles of San Francisco.

On several days of the month, particularly on the 8th and 9th and the 18th to 24th, vessels reported smoke from burning brush which somewhat impeded navigation close on the coasts of Guatemala and Salvador. This most generally prevailed in the early morning, being carried inland by the sea breeze about 8:30 a. m.

THE FIJI ISLANDS STORM OF FEBRUARY 17-MARCH 2, 1931

By WILLIS E. HURD

In an official report dated March 10, 1931, to the Secretary of State, the American consul at Suva, Fiji, Quincy F. Roberts, begins thus:

The Fiji Islands, during the period February 17 to March 2, 1931, experienced a hurricane and floods said to be the worst in the history of the colony.

Unfortunately there are not yet exact data at hand from which to determine whether one or two cyclones hovered about the islands during this period, although it was not until the 3d of March that westerly winds arrived at Suva, near the southeastern extremity of the largest island, which indicated by the circulation that the center was receding southward. According to newspaper reports, two hurricanes devastated the islands, one about the 21st and 22d of February and the other on the 1st and 2d of March. These are the four days on which, during 14 days of stormy weather with periods of abnormally heavy rainfall, the meteorological conditions were apparently most violent. The destruction to property, including buildings and cattle, and to such crops as breadfruits and sugarcane, as well as the loss of approximately 200 lives, was probably confined to the principal island, Viti Levu. Most of the loss of life was by drowning in the extraordinary floods produced on the eastern slopes of the island, where many villages were wholly destroyed.

While the gales did not exceed force 9 at Suva, according to the consular report, yet hurricane velocities occurred in various districts, especially in the north and west, where the cyclonic force seems to have centered, and also at sea. In some localities both east and west of the principal mountain range the flood stages in the rivers were the highest of record. The heaviest rainfall reported occurred at Nandarivatu, on the western slope of the range, near Mount Victoria, where 84 inches fell in less than a week. The heavy precipitation occurred to the east of the storm center and quite apparently in the forward left-hand quadrant, as the cyclone seemingly moved southwestward during the occurrence of most of these excessive rains.

The lowest barometer reading reported was 28.70 inches, occurring at Lautoka, on the northwest of Viti Levu, at midnight of the 21st. Shipping was much hampered by the heavy seas, the high winds, and the thick weather, which prevented a landing. The steamship *Golden Harvest* occupied 15 days in making the trip of 1,500 miles between Brisbane and Fiji, and the steamship *Malake* spent three days during the 21st to 24th in steaming the 50 or 60 miles between the Fijian ports of Levuka and Suva, harbor lights being obscured by the blinding rain, and the ship also being driven off her course by the terrific winds and seas.

BUCKET OBSERVATIONS OF SEA-SURFACE TEMPERATURES

By GILES SLOCUM

STRAITS OF FLORIDA AND CARIBBEAN SEA

The temperatures herein published are the means of the average temperatures for the four quarters of the month, except that, in the case of the 5° subdivisions of the Caribbean Sea, the figures shown are the simple means of the observed temperatures with the entire month taken as a unit. Table 1 shows the lengths of the quarters for each length of month.

Table 2 shows the average temperature for the Caribbean Sea and the Straits of Florida for March of each year from 1919 to 1930, inclusive, and Table 3 summarizes the temperature for the month in the same areas, including the departures of the March, 1930, means from the 11-year means for March (1920-1930), and the changes from the temperatures for the preceding month of February, 1930.

The chart shows the number of observations taken during the month of March, 1930, within each 1° square; the mean temperature of the Straits of Florida, and of each 5°¹ subdivision of the Caribbean Sea: The 11-year means (1920-1930) for these areas; and the local mean time corresponding to Greenwich mean noon, at which time the mariners are instructed to make the temperature readings.

March normally brings the turn of the season in the temperature of the surface water in the Caribbean Sea and the Straits of Florida, the first quarter showing, in both bodies of water, the lowest average temperatures of any winter quarter-month, the means for the 11 years in this quarter-month being 78.2° in the Caribbean Sea and 73.9° in the Straits of Florida.

The temperature rises noticeably during the last days of March. This effect has, in the majority of years for which observations are available, made March warmer than February, more than compensating for the downward trend of the average temperature, which persists until some days after the month begins.

The seasonal lag is thus between 70 and 80 days after the winter solstice, as compared with the 15 to 40 day lag of air temperatures along the island and continental coast lines of the region.

Reference to Table 3 will show that the temperatures rose markedly from the February values, which were close to normal, to rather high figures for March in both the Caribbean Sea and the Straits of Florida. The third quarter was, in the Caribbean, as warm as the mean for the corresponding part of April, with the abnormally high readings occurring principally within the western half of the sea and south of the twentieth parallel.

TABLE 1.—Lengths of "Quarter-months" used in computing mean sea-surface temperatures

Length of month	Days of month included in quarter			
	I	II	III	IV
28 days.....	1-7	8-14	15-21	22-28
29 days.....	1-7	8-14	15-21	22-29
30 days.....	1-7	8-15	16-22	23-30
31 days.....	1-7	8-15	16-23	24-31

¹ In three cases, as indicated on the chart, the observations for small, little traveled, and unimportant areas at the outer limits of the Caribbean Sea have been treated as parts of contiguous 5° subdivisions.

Distribution of Greenwich Mean Noon Bucket Observations of Sea-Surface Temperatures, March, 1930

(Plotted by Giles Slooem)

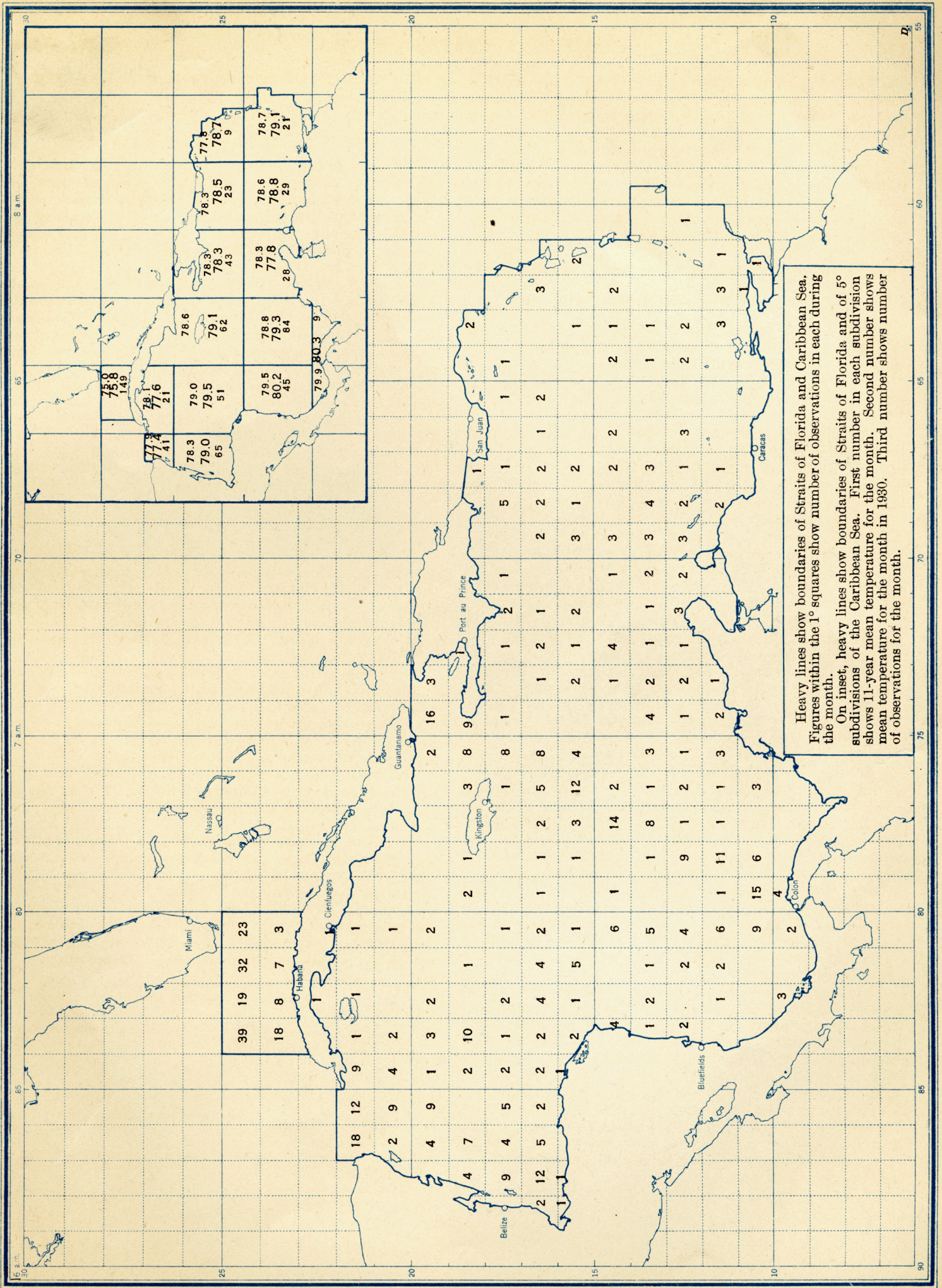


TABLE 2.—Mean sea-surface temperatures in the Caribbean Sea and the Straits of Florida for March (1919-1930)

Year	Caribbean Sea		Straits of Florida	
	Number of observations	Mean (°F.)	Number of observations	Mean (°F.)
1919	26	78.8	15	78.2
1920	139	78.9	20	72.2
1921	194	78.2	53	75.8
1922	170	78.7	75	75.9
1923	346	77.6	110	76.0
1924	318	78.3	84	73.5
1925	247	78.6	73	75.0
1926	434	79.2	129	73.9
1927	347	79.1	126	76.0
1928	360	79.0	106	74.7
1929	457	78.6	146	76.1
1930	531	78.9	149	75.8
Mean (1920-1930)		78.6		75.0

¹ Not used in computations because of insufficient data available.

TABLE 3.—Mean sea-surface temperatures (°F), and number of observations, March, 1930

Quarter	Period	Caribbean Sea				Straits of Florida			
		Number of observations	Mean	Departure from 11-year mean (1920-1930)	Change from preceding month	Number of observations	Mean	Departure from 11-year mean (1920-1930)	Change from preceding month
I.	1-7	114	78.0	°F.	°F.	31	74.7	°F.	°F.
II.	8-15	145	78.8	°F.	°F.	38	76.8	°F.	°F.
III.	16-23	123	79.6	°F.	°F.	40	75.8	°F.	°F.
IV.	24-31	149	79.2	°F.	°F.	40	75.9	°F.	°F.
Month.		531	78.9	+0.3	+0.5	149	75.8	+0.8	+1.2

CLIMATOLOGICAL TABLES

CONDENSED CLIMATOLOGICAL SUMMARY

In the following table are given for the various sections of the climatological service of the Weather Bureau the monthly average temperature and total rainfall; the stations reporting the highest and lowest temperatures, with dates of occurrence; the stations reporting the greatest and least total precipitation; and other data as indicated by the several headings.

The mean temperature for each section, the highest and lowest temperatures, the average precipitation, and the greatest and least monthly amounts are found by using all trustworthy records available.

The mean departures from normal temperatures and precipitation are based only on records from stations that have 10 or more years of observations. Of course, the number of such records is smaller than the total number of stations.

Condensed climatological summary of temperature and precipitation by sections, March, 1931

(For description of tables and charts, see REVIEW, January, p. 50)

Section	Temperature								Precipitation							
	Section average	Departure from the normal	Monthly extremes						Section average	Departure from the normal	Greatest monthly		Least monthly		Amount	Amount
			Station	Highest	Date	Station	Lowest	Date			Station	Amount	Station	Amount		
Alabama	49.9	+0.0	2 stations	78	19	Valley Head	22	4	3.30	-2.16	Seven Hills	7.26	Tuskegee	1.78		
Arizona	53.4	+0.5	Le Sage	100	22	Alpine	-12	26	0.23	-0.85	Henry's Camp	1.66	29 stations	0.60		
Arkansas	47.5	-5.1	Okay	85	13	Dutton	16	10	4.21	-0.47	Wynne	6.83	Portland	2.73		
California	52.2	+2.6	Mecca	100	22	Elery Lake	-2	29	1.47	-2.38	Crescent City	10.87	9 stations	0.09		
Colorado	52.2	-2.4	3 stations	81	22	Spicer	-25	27	1.17	-0.21	La Veta Pass	4.37	Las Animas	0.18		
Florida	50.5	-6.1	Fort Lauderdale	86	29	Mount Pleasant	26	5	5.23	+2.11	Garniers	9.25	Carrabelle	2.40		
Georgia	51.2	-5.3	Quitman	84	27	Clayton	19	5	2.96	-2.02	Clayton	7.25	Goat Rock	1.45		
Idaho	55.9	0.0	Glens Ferry	77	22	Felt	-20	6	2.40	+0.81	Roland	7.54	Ashton	0.20		
Illinois	37.3	-3.8	Mascontah	69	13	2 stations	12	11	2.75	-0.30	Anna	4.67	Hoopston	1.08		
Indiana	36.7	-4.0	Rome	68	23	Goshen	1	13	3.03	-0.72	Shoals	5.37	Noblesville	1.64		
Iowa	34.9	+0.3	Baxter	64	13	Decorah	5	30	1.68	-0.08	Fairfield	4.18	Alton	0.15		
Kansas	39.1	-4.6	St. Francis	85	18	Goodland	-3	27	2.41	+0.92	Trousdale	4.77	Irene	0.90		
Kentucky	41.5	-4.8	Williamsburg	73	24	3 stations	18	13	3.68	-1.01	Quicksand	5.79	Cold Spring	2.11		
Louisiana	54.3	-6.4	Melville	84	14	Robeline	25	10	4.15	-0.59	Pearl River	0.55	Logansport	1.46		
Maryland-Delaware	39.3	-3.7	2 stations	65	25	2 stations	14	11	4.38	+0.95	Millsboro, Del.	5.97	Picardy, Md.	3.22		
Michigan	30.2	+0.6	Ganges	59	23	Wolverine	-14	11	2.05	-0.12	Deer Park	3.75	St. Ignace	0.78		
Minnesota	28.5	+2.2	Beardsley	63	20	2 stations	-12	15	1.23	+0.15	Roseau	2.12	Pigeon River Bridge	0.21		
Mississippi	51.2	-5.6	6 stations	80	14	Batesville	24	10	4.63	-1.14	Pontotoc	7.95	Lake	2.35		
Missouri	39.5	-4.4	5 stations	70	13	Unionville	10	4	3.02	0.00	Poplar Bluff	6.03	Edgerton	1.23		
Montana	32.7	+2.6	Billings	74	21	Adel (near)	-22	27	0.80	-0.12	2 stations	4.34	2 stations	T.		
Nebraska	24.5	-1.4	Benkelman	78	22	Mullen	-14	27	1.74	+0.64	Curtis	5.25	Hull (near)	0.36		
Nevada	42.1	+1.2	Las Vegas	92	22	San Jacinto	-3	17	0.48	-0.40	Lewers Ranch	2.80	3 stations	0.80		
New England	34.7	+2.4	Adams, Mass.	64	28	Pittsburg (a), N. H.	-14	3	3.78	+0.52	Falmouth, Mass.	8.14	Bethlehem, N. H.	0.72		
New Jersey	39.2	+0.7	2 stations	64	25	Belleplain	12	14	4.14	+0.30	Chatham	6.06	Layton	2.60		
New Mexico	40.5	-2.5	do	89	22	Selhor Ranch	-26	8	0.99	+0.13	Gallinas Planting Station	3.86	3 stations	0.00		
New York	33.8	+1.7	Mohank Lake	68	27	North Lake	-3	3	2.27	-0.74	Cutehogue	6.96	Sperryville	0.62		
North Carolina	44.4	-5.5	2 stations	77	14	Mount Mitchell	1	5	3.66	-0.54	Mount Mitchell	7.82	Marshall	1.26		
North Dakota	25.7	+1.6	Porta	63	31	Towner	-24	26	0.94	+0.24	Bowman	2.33	Westhope	0.67		
Ohio	36.2	-3.1	Ironton	66	24	Canfield	11	21	1.24	-1.28	2 stations	3.97	London	1.17		
Oklahoma	45.6	-5.4	Hollis	85	12	Hooker	-2	31	3.06	+1.24	Buffalo	5.08	Kenton	1.02		
Oregon	42.2	+1.4	2 stations	80	2	Lake	-3	7	4.06	+1.43	Valsetz	29.54	Lake	0.57		
Pennsylvania	36.3	-1.4	Gettysburg	69	27	3 stations	10	13	2.96	-0.48	New Park	5.72	Montrose	0.70		
South Carolina	48.8	-5.8	Garnett	78	14	Caesar's Head	18	5	2.98	-0.97	Crescent	5.29	Darlington	1.39		
South Dakota	31.9	+0.3	Cedar View	72	22	Lead	-16	26	1.16	+0.11	Dumont	3.17	Onaka	0.21		
Tennessee	44.1	-5.3	Clarksville	72	13	Elkmont	11	5	3.79	-1.55	Celina	5.44	Johnson City	1.28		
Texas	52.7	-6.0	Mission	95	26	Miami	4	27	2.50	+0.42	Bon Wier	7.30	2 stations	T.		
Utah	37.8	-0.4	St. George	85	21	Woodruff	-11	27	0.82	-0.71	Silver Lake	3.33	Escalanti	0.00		
Virginia	40.7	-5.2	Diamond Springs	69	25	Burkes Garden	15	18	3.56	-0.10	Onley	5.90	Damascus	1.64		
Washington	42.0	+1.1	Nespelem	79	12	Bumping Lake	6	4	5.96	+1.98	Big Four	29.94	Oroville	0.43		
West Virginia	37.4	-5.3	Romeny	86	27	Pickens	10	13	3.52	-0.26	Pickens	7.95	Upper Tract	1.90		
Wisconsin	30.4	+1.1	3 stations	58	12	Downing	-18	1	1.73	-0.01	Racine	5.71	Chippewa P. K. Reservoir	0.42		
Wyoming	29.0	-0.6	Thermopolis	71	21	Foxpark	-33	6	1.04	-0.04	Bechler River	4.93	Dubois	0.10		
Alaska (Feb.)	14.3	+6.9	Tree Point	53	3	Pilot Station	-43	27	2.27	+0.38	Ketchikan	16.15	Barrow	0.62		
Hawaii	70.3	+1.0	Kaanapali	90	23	Volcano Observatory	46	6	3.98	-4.92	Kawainui (lower)	17.99	Launipoko	0.60		
Porto Rico	75.9	+2.6	Dorado	96	17	Jayuya	50	15	2.67	-0.91	Barro	9.40	Santa Isabel	0.13		

¹ Other dates also.